Tanta University

Faculty of engineering

Computers and Automatic control department

Fuzzy Logic Control (FLC)

Fourth year student

Sheet 4
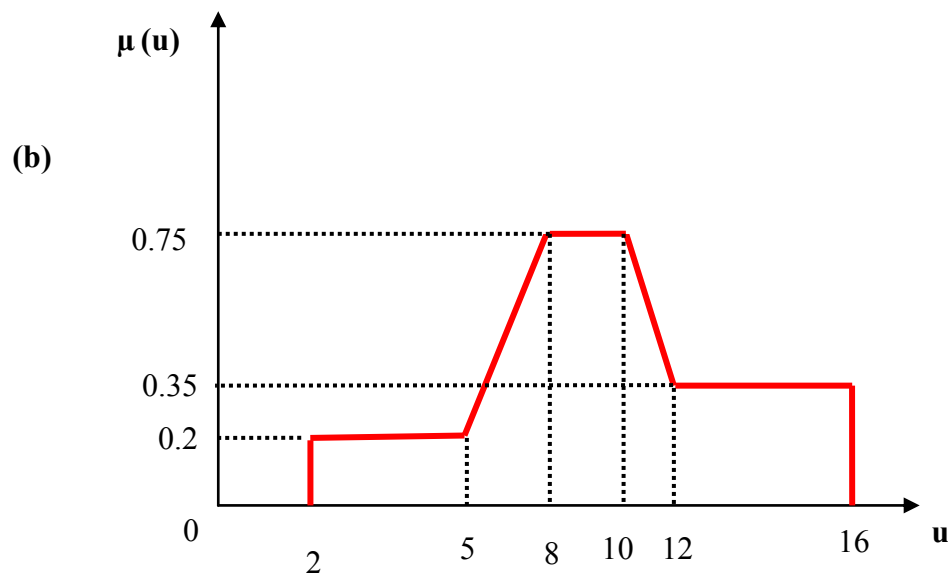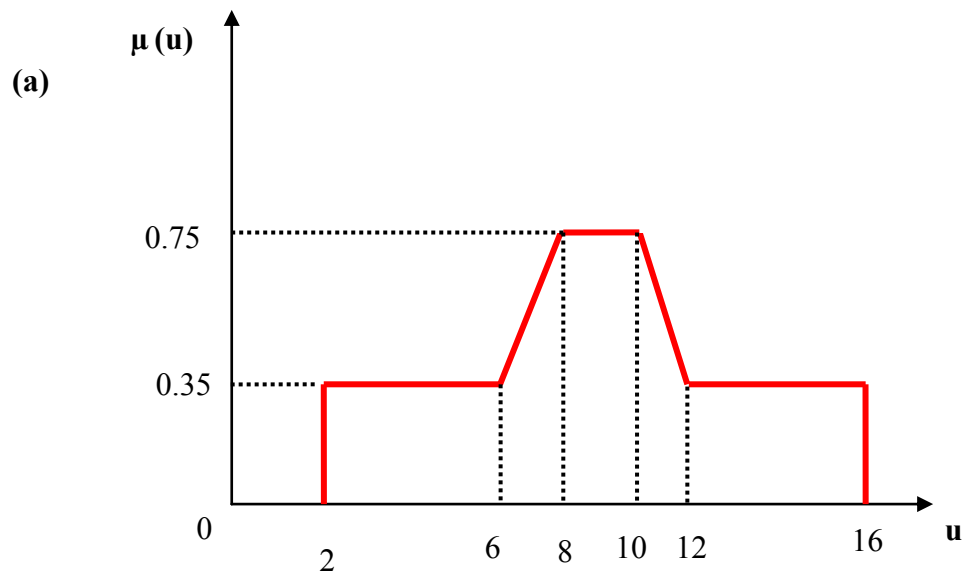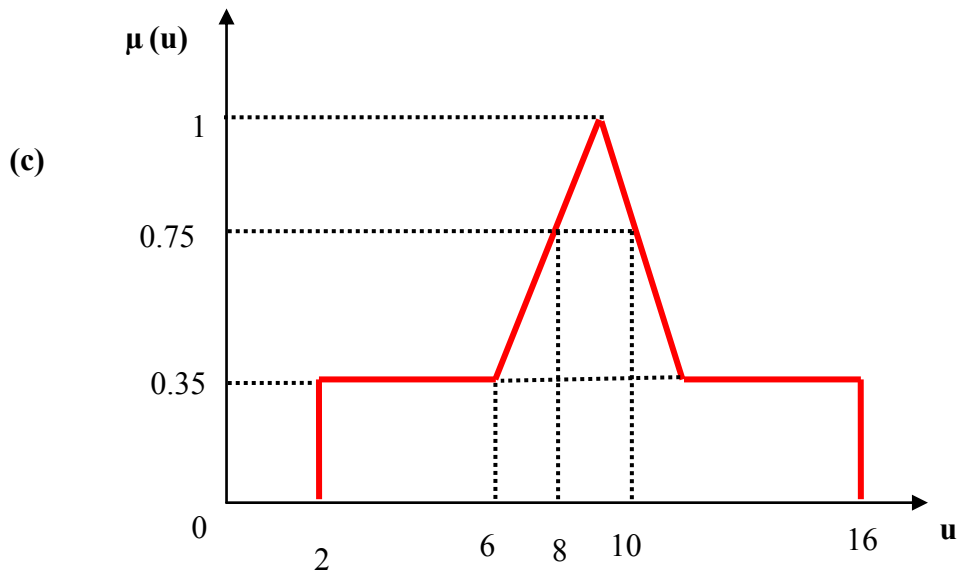
1- Find the crisp out of the fuzzy controller that has the following over all fuzzy output as shown in the following cases:

(a)

(b)

(c)

2- Using the error signal (e) and the change of error (Δe), design a fuzzy-PD controller with the following specs:

- No. of MFs for the inputs (e and Δe) is 5.

- No. of MFs for the output (u) is 5.

- Use (NM , NS , Z , PS , PM) as the labels of MFs for the inputs (e and Δe).

- Use (NL , NM , NS , Z , PS , PM , PL) as the labels of MFs for output (u).

- The universe of discourse :

    e $\longrightarrow$ from -4 to 4

    Δe $\longrightarrow$ from -1 to 1

    u $\longrightarrow$ from -9 to 9

(1) Draw the MFs for the inputs and output.

(2) Write the suitable rules.

(3) Find the controller crisp output (u^{crisp}) and fuzzy output forms, in the following cases:

e = 3 and Δe = -0.5

e = -2 and Δe = -0.2

e = 2.6 and Δe = 0.35

(Compare your results with MATLAB results)